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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/607,154	06/27/2003	Koichiro Nakatani	116377	5176
25944	7590	04/05/2005	EXAMINER	
OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			NGUYEN, TU MINH	
			ART UNIT	PAPER NUMBER
			3748	

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/607,154

Applicant(s)

NAKATANI ET AL.

Examiner

Tu M. Nguyen

Art Unit

3748

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 22 February 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-32 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-4, 11-22, 25 and 27-32 is/are rejected.
- 7) ☒ Claim(s) 5-10, 23, 24 and 26 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to, by the Examiner.
- 10) ☒ The drawing(s) filed on 27 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

### DETAILED ACTION

1. An Applicant's Amendment filed on February 22, 2005 has been entered. Claims 1 and 18 have been amended. Overall, claims 1-32 are pending in this application.

#### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3, 11-21, 25, and 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Molinier (U.S. Patent 6,758,036) in view of Takahashi et al. (U.S. Patent 6,679,050).

Re claims 1, 18, and 19, as shown in Figure 6, Molinier disclose a device for purifying exhaust gas for an engine having an exhaust passage, the engine being operated with a lean air-fuel ratio, the device comprising:

- a SO<sub>x</sub> storage (3) arranged in the exhaust passage for temporarily storing SO<sub>x</sub> contained in an exhaust gas inflowing therein;
- an auxiliary catalyst (5) arranged in the exhaust passage downstream of the SO<sub>x</sub> storage, the auxiliary catalyst having an oxidizing ability;

- SOx discharging means (2A, 2B) for discharging SOx stored in the SOx storage therefrom; and

- atmosphere control means (4, 9) for controlling an atmosphere of the auxiliary catalyst, wherein discharge of SOx stored in the SOx storage therefrom is prevented or suppressed when the auxiliary catalyst is in, or is turned to, a sulfate forming atmosphere in which an amount of a reducing agent contained in the exhaust gas flowing to the auxiliary catalyst is smaller than an allowable minimum amount (i.e., when an air-fuel ratio of the exhaust gas at the auxiliary catalyst is lean or less than stoichiometry) (according to the Abstract, a regeneration of the SOx storage (3) is suppressed until a rich environment is established at the auxiliary catalyst (5)); and

wherein, when SOx stored in the SOx storage is discharged therefrom with the atmosphere of the auxiliary catalyst being in a sulfate forming atmosphere in which an amount of a reducing agent contained in the exhaust gas flowing to the auxiliary catalyst is smaller than an allowable minimum amount, the atmosphere of the auxiliary catalyst is changed to an atmosphere (rich) other than the sulfate forming atmosphere (lean), and when SOx stored in the SOx storage is discharged therefrom with the atmosphere of the auxiliary catalyst being in an atmosphere other than the sulfate forming atmosphere, the atmosphere of the auxiliary catalyst is maintained at an atmosphere (rich) other than the sulfate forming atmosphere (also see lines 34-40 of column 2 and line 61 of column 5 to line 6 of column 6), whereby the formation and discharge of sulfate from the auxiliary catalyst is reduced (since a fuel rich atmosphere is established at the auxiliary catalyst at the time of SOx release from the SOx storage, the

Art Unit: 3748

formation and discharge of sulfate from the auxiliary catalyst is inhibited or reduced (see the Abstract)).

Molinier, however, fails to disclose that in a sulfate forming atmosphere, a temperature of the auxiliary catalyst is higher than an allowable maximum temperature.

As shown in Figure 1, Takahashi et al. teach an exhaust emission control device for an engine, in which a sulfate forming atmosphere for a catalyst (9) is clearly defined. As indicated on lines 17-36 of column 5, the catalyst (9) only adsorbs SO<sub>x</sub> during a lean air-fuel ratio environment and adsorbs more SO<sub>x</sub> when a temperature of the catalyst is higher than a predetermined temperature. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the teaching by Takahashi et al. to recognize that during a sulfate forming atmosphere, a temperature of the auxiliary catalyst (5) in Molinier is higher than an allowable maximum temperature.

Re claims 2 and 20, the device of Molinier further comprises means (4, 9) for controlling the temperature of the auxiliary catalyst (5), wherein the temperature of the auxiliary catalyst is lowered to, or maintained at, a temperature which is not higher than the allowable maximum temperature, to change the atmosphere of the auxiliary catalyst to, or maintain the atmosphere of the auxiliary catalyst at an atmosphere other than the sulfate forming atmosphere.

Re claims 3 and 21, the device of Molinier further comprises means (4, 9) for controlling an amount of the reducing agent contained in the exhaust gas flowing to the auxiliary catalyst (5), wherein the amount of the reducing agent is increased to, or maintained at an amount which is not smaller than the allowable minimum amount, to change the atmosphere of the auxiliary

Art Unit: 3748

catalyst to, or maintain the atmosphere of the auxiliary catalyst at, an atmosphere other than the sulfate forming atmosphere.

Re claims 11 and 25, in the device of Molinier, the temperature of the SOx storage (3) is maintained at a temperature not lower than a SOx amount reduction required temperature (a desorbed or discharged SOx temperature) which is higher than the allowable maximum temperature while an air-fuel ratio of the exhaust gas flowing to the SOx storage is maintained at a rich or stoichiometric air-fuel ratio, to discharge SOx stored in the SOx storage therefrom.

Re claims 12 and 27, in the device of Molinier, the SOx discharging means comprises means for obtaining an amount of SOx stored in the SOx storage, and SOx stored in the SOx storage is discharged therefrom when the amount of SOx stored in the SOx storage is larger than an allowable SOx amount (see Takahashi et al.: steps S105-S106).

Re claims 13 and 28, in the device of Molinier, the SOx storage (3) comprises a storage which stores SOx contained in the inflowing exhaust gas in a form of sulfate salt (lines 40-56 of column 3).

Re claims 14 and 29, in the device of Molinier, the SOx storage (3) comprises a storage (a precious metal) which stores SOx contained in the inflowing exhaust gas without forming sulfate salt (lines 31-39 of column 3).

Re claims 15 and 30, in the device of Molinier, the SOx storage (3) comprises a NOx catalyst which stores therein NOx contained in the inflowing exhaust gas when the air-fuel ratio of the inflowing exhaust gas is lean, and reduces NOx stored therein to reduce an amount of NOx stored therein when a reducing agent is contained in the inflowing exhaust gas and the air-fuel ratio of the inflowing exhaust gas is lowered (the SOx storage (3) also includes a NOx trap

Art Unit: 3748

(lines 31-39 of column 3) which absorbs NO<sub>x</sub> in the exhaust gas when the inflowing exhaust gas is lean).

Re claims 16 and 31, in the device of Molinier, the auxiliary catalyst (8) includes precious metals such as platinum without including alkali metals, alkali earth metals, and rare earth metals.

Re claims 17 and 32, in the device of Molinier, the auxiliary catalyst (5) comprises a NO<sub>x</sub> catalyst which stores therein NO<sub>x</sub> contained in the inflowing exhaust gas when the air-fuel ratio of the inflowing exhaust gas is lean, and reducing NO<sub>x</sub> stored therein to reduce an amount of NO<sub>x</sub> stored therein when a reducing agent is contained in the inflowing exhaust gas and the air-fuel ratio of the inflowing exhaust gas is lowered.

4. Claims 4 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Molinier in view of Takahashi et al. as applied to claims 1 and 18, respectively, above, and further in view of Hirota et al. (U.S. Patent 5,974,791).

The device of Molinier discloses the invention as cited above, however, fails to disclose that the SO<sub>x</sub> storage is carried on a particulate filter for collecting particulates contained in the inflowing exhaust gas.

As shown in Figure 1, Hirota et al. teach an exhaust gas purification device for an engine, comprising at least a DPF (10a) having an alkali metal and/or alkali earth metal (lines 59-64 of column 5 and lines 44-49 of column 6) to absorb SO<sub>x</sub> in the exhaust gas. It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the DPF taught by Hirota et al. in the device of Molinier, since the use thereof would have also eliminated harmful soot emission in the exhaust gas.

***Allowable Subject Matter***

5. Claims 5-10, 23, 24, and 26 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

***Response to Arguments***

6. Applicant's arguments with respect to the references applied in the previous Office Action have been fully considered but they are not persuasive.

Applicant appears to argue that Molinier fails to disclose or suggest "when SO<sub>x</sub> is released from the SO<sub>x</sub> storage and the auxiliary catalyst is in a sulfate forming atmosphere (i.e., lean atmosphere), the atmosphere of the auxiliary catalyst is changed to an atmosphere (i.e., rich atmosphere) other than the sulfate forming atmosphere; and if the auxiliary catalyst is in an atmosphere (i.e., rich atmosphere) other than the sulfate forming atmosphere, the atmosphere of the auxiliary catalyst is maintained at the atmosphere (i.e., rich atmosphere) other than the sulfate forming atmosphere" (pages 11-12 of Applicant's Amendment). The examiner respectfully disagrees with this argument.

The Abstract in Molinier reads "*A NO<sub>x</sub> adsorber is protected from sulfur poisoning by introducing fuel to the NO<sub>x</sub> adsorber prior to a sulfur trap and/or particulate trap regeneration stream entering the NO<sub>x</sub> adsorber. The fuel establishes a rich environment, thereby inhibiting sulfur adsorption in the NO<sub>x</sub> adsorber*". Thus, when SO<sub>x</sub> is to be released from the sulfur trap, the atmosphere at the NO<sub>x</sub> adsorber in Molinier is changed to and



maintained at a rich atmosphere to prevent the adsorption of SO<sub>x</sub> in the NO<sub>x</sub> adsorber. This paragraph is a match with the claimed feature outlined above. Therefore, Molinier et al. clearly suggest the claimed feature in dispute.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., auxiliary catalyst in the pending application is not a NO<sub>x</sub> adsorber (page 12 of Applicant's Amendment)) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, Applicant is confused to why the teachings of Takahashi et al. should be combined with Molinier (page 13 of Applicant's Amendment).

The reference of Takahashi et al. is only utilized to show an obvious fact that a sulfate forming atmosphere for a catalyst adsorber (9) is well defined and understood. As indicated on lines 17-36 of column 5, the catalyst adsorber (9) only adsorbs SO<sub>x</sub> during a lean air-fuel ratio environment and adsorbs more SO<sub>x</sub> when a temperature of the catalyst is higher than a

predetermined temperature. Thus, the claimed feature of “a temperature of the auxiliary catalyst in a sulfate forming atmosphere is higher than an allowable maximum temperature” is obvious to one with ordinary skill in the art. There is no modification whatsoever of the device and the method of operating the device in Molinier by the combination of two references.

### ***Conclusion***

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

*Communication*

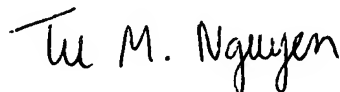
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (571) 272-4862.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (571) 272-4859. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TMN

April 3, 2005



Tu M. Nguyen

Primary Examiner

Art Unit 3748